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DESCRIPTION

OF THE

METHOD OF MOULDING AND CASTING

HEADS, MASKS, MEDALLIONS, &C.

Art. XXV. — *A Description of the Method of Moulding and Casting Heads, Masks, Medallions, &c.*

Messrs. Editors—In accordance with your request, I send you a description of the manner of taking casts of heads, masks, &c., hoping that phrenologists will use the hints it affords, to form collections of casts illustrative and confirmative of the doctrines which they have espoused. If individuals of this country, interested in phrenology, will only take the pains, they may easily, and at a comparatively small expense, have such cabinets as are exhibited in the European cities — a cursory examination of which has brought many an anti-phrenologist to believe in the sublime truths of phrenology, and has silenced the opposition of many cavilers. Many have visited the cabinets of the Edinburgh and London societies, and those of Deville and of Vimont, to scoff, but have left them to restrain their incautious tongues, or to study the science with impartiality. Louis Philip, King of the French, during his late visit to the cabinet of the Paris Phrenological Society, while acknowledging the truths of the science and mentioning the immense advantages which would accrue from a knowledge of them, remarked that phrenology would soon do away some of the great errors in criminal jurisdiction, particularly that of capital punishment.

The article which follows was originally written for the 'Scientific Tracts.' Although several additions have been made, it was not deemed expedient to alter its phraseology in any essential manner, as it was particularly written with a view to conciseness. Nothing, if we except the last description of taking busts, is stated that has not been tried, not by experiment alone, but by considerable practice. S.

An attempt has been made to give, in a few words, a practical account of the manner of making figures, and also the moulds in which they are cast. If the attempt has been successful, the writer will not deem the short time spent in preparing it wasted.

To the amateur, antiquary, painter, surgeon, and the different artists, it would be useless to mention the various uses of this art; for they, and they alone, know the advantages it can afford them in their several pursuits.

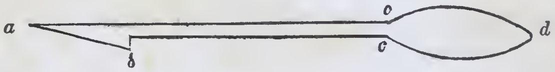
MATERIALS AND APPARATUS.

Before proceeding to the subject, it will be well to mention the articles and apparatus which are requisite. For casting and making moulds, the following materials are used, viz: plaster of Paris, (or native sulphate of lime,) sulphur, wax, fish-isinglass, tinfoil, and tin. The plaster is prepared by being ground very fine, and is afterwards boiled or baked, as is required for coarse or fine casting. By this means the water of crystalization is expelled. When an article of an extra fineness is required, the plaster is again passed between the stones of the mill and sifted. The nicest will resemble the finest wheat flour. The moisture of the atmosphere will injure it, if it is exposed to its influence; therefore it, and every other description of dampness must be guarded against. For medallions and ornamental figures, the plaster cannot be too fine and white; for moulds, a coarser sort will do. Figure-casters prefer for use that which is the slowest in hardening; the reason is, that it enables them to cast more figures at one mixing. For some purposes — as for taking masks — it cannot harden too quickly.

When water is added to this impalpable powder, it supplies the place of that expelled by the process of baking, and causes it to reassume the solid form without shrinking or warping. Plaster already prepared for casting can be obtained at a trifling expense, in every large city. In this, there are several mills exclusively devoted to the purpose of preparing it for casting and stucco-work.

Although plaster is generally used for casting figures and making moulds, nevertheless, for some purposes, other articles are much better. Sulphur is much used for taking moulds from coins, medallions and bass-reliefs, on account of the exact and minute impression which it is capable of receiving. Tin-foil and tin are used when sulphur would injure the medals to be copied. Wax is much used for imitating fruit and flowers, and for some parts of plaster moulds, where it would be difficult to use the gypsum. Isinglass and common glue have likewise their appropriate use. These articles can be obtained from any druggist.

Fig. I.



The utensils necessary for casting are always at hand: viz. bowls, spoons, knives, &c. For trimming casts, it would be well to have an instrument (see fig. I.) about eight inches long, the edges of which, from *a* to *b*, and from *c* to *d* around to *c*, are sharp; from *b* to *c* the instrument should be round, that it may be held more conveniently by the operator. This can be made by any smith, from a piece of steel, or from brass, which is much better, on account of its not rusting. The bowl used, should have a spout or nose, like that of a pitcher, in order to direct the material, when required, in a small stream. The other necessary things will suggest themselves.

MANNER OF MIXING PLASTER AND WATER.

One of the most important parts, and perhaps the most difficult of casting, is to mix the plaster and water properly. This is done as follows:—As much water as is necessary to be used is put into the bowl; the plaster is then shaken into it from the hand or a spoon, *without stirring*, till no more can be moistened by the water. In this situation it is suffered to remain about one minute, until the plaster is free from air; this can be known by the ceasing of the mixture to bubble; by this means small holes are prevented from occurring in the casts, which is a very desirable object. The contents of the bowl are then stirred together and used. In casting hollow figures, the mixture should have the consistency of cream; for making moulds, it should be less fluid. The plaster must be used as soon as it is well mixed; if not sufficiently fluid the mixture can be diluted, but this must be done when it is first stirred, else it will be filled with lumps.

MANNER OF MAKING MOULDS.

The mode of making moulds differs according to the objects to be copied. For instance, any thing soft and pliable, like parts of the human body, may be easily taken at once, as the object can be delivered from the cast without injury to either; whereas, from a hard body, as a marble bust, many pieces are required. Each manner will be described separately.

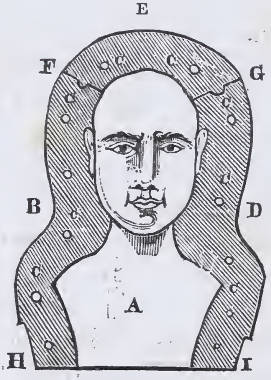
Moulds from a soft and yielding substance.— In making a mould from a soft and yielding substance, it is necessary first to lubricate the object well with a mixture of oil and tallow. The oil is used to prevent the plaster, when hardened, from adhering too tenaciously to the object to be copied; and, without the slight adhesive power of the tallow, the liquid plaster would be apt to run off as fast as put on. After having put the oil and tallow on delicately and thoroughly with a brush, the plaster must be mixed with the water, and laid on. At first, there should be only a thin coat, in order to prevent distortion, which would ensue, if much of the heavy material were to be heaped on. After the plaster has become somewhat firm, enough should be put on to give the mould a tolerable degree of strength. When hard, the object must be carefully removed, after which it is ready to be seasoned, the process of which will be described in its proper place.

Moulds from flat surfaces of hard bodies. — Moulds from flat surfaces of hard bodies are made in precisely the same way as the last described.

Moulds from *medallions* are best made of sulphur. The mode of making them is this :—First, the medal, if it is of plaster, must be seasoned; then a rim of sheet tin, of about half an inch in width, must be placed around it, and be kept in place by a cord. The medal must next be delicately oiled with a little olive oil. Thus prepared, it must be held to the fire till it is quite warm; after which the melted sulphur must be poured upon it, and allowed to get nearly cold. Just before it is cold, if a little freshly-mixed plaster is cast upon the sulphur, it will cause the mould to separate itself from the medal, and, besides, will give it additional strength. Moulds thus made require no seasoning, and give beautiful impressions.

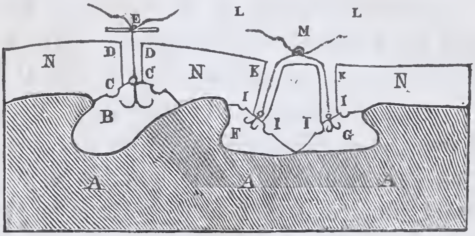
If the process be reversed, (the plaster cast being the mould instead of the model) and a little protoxide of iron, more commonly known as *crocus martis*, mixed with the sulphur, the cast will resemble, in a very great degree, a bronzed medallion. The addition of the protoxide is said to give more strength and durability to the sulphur, rendering it less liable to crack by the sudden application of warmth, and thereby increasing its value for making moulds and casts.

Fig. II.



Moulds from hard and irregular bodies.—Moulds from hard and irregular bodies, as from figures, busts, &c., consist of many pieces, and on that account are more difficult to make than those above described. They are made piece by piece, in the following manner: — First, one piece must be made as was directed above, while describing the manner of making moulds from flat surfaces of hard bodies, care being taken that the mould will separate from the object without damage to either. This piece must be trimmed smoothly at the edges, and a few holes, or, as they are technically called, *keys*, must be made in the edges, that the other pieces may make a good joint with it, and the parts of the mould be more easily kept together. The piece thus finished must be placed on the object exactly in its first position, and its edges well greased, to prevent its adhering to the piece to be cast next. Another part is now to be cast, and served in the same way until the whole mould is completed. One example will give a much better idea of the process. Let A (Fig. II.) be a bust, from which a mould is required to be taken. In the first place, the bust (A) must be well brushed over with oil; the plaster (B) is then put on by a spatula or spoon, and, as it grows hard, is heaped on, until the piece is sufficiently thick to be strong. This piece, (B) as can be seen from the figure, covers a part of the bust extending from F to H. After having become hard, it is removed from the bust and trimmed, as stated above. Another piece (D) is made on the opposite side of the bust, extending from G to I. When it has become hard, it is removed and trimmed smooth. Small round depressions (C) are made in all the sides trimmed, (except the bottom in this case) to serve the purpose of keys, with the instrument described above and shown in Fig. I. These two pieces, thus made, are to have the trimmed edges well greased; they are then to be put upon the bust in their former places, and secured firmly by a cord. A third piece (E) must then be cast and trimmed as the pieces B and D, care being taken not to move the pieces B and D, as when hardened they are to form a water-tight joint with the piece E. This third piece will have small round protuberances on the extremities which come in contact with the other pieces, and which correspond to their depressions, and serve to keep them all firmly together, when put in their proper position without the bust. Small depressions must now be made in the front and back edges of the piece E, at the places marked C. Having proceeded thus far, the three pieces must be greased and placed upon the bust, which will then have the appearance that is represented by Fig. II. To finish the mould, the front and back, respectively, must be greased, and plaster afterwards cast upon them. When sufficiently hardened, these pieces must be removed from the bust, and put together without it. In this situation they will form a hollow mould, which must be seasoned, as will be mentioned hereafter, before it will be ready for use.

Fig. III.



It sometimes happens that internal pieces, as B, F, and G, of Fig. III, are required. These must be made first, and, while the plaster is soft, a loop of wire must be placed in each of them. The keys, (C, C, and I, I,) must not be forgotten. These pieces, when hard, must be removed, trimmed smooth, and well greased. A little glazier's putty must next be put around the loops of wire, and the pieces be replaced. The piece N, N, N, must be cast next; when hard it must be removed, and the holes D, D, and K, K, bored entirely through it, where the loops of the internal pieces will come, or rather, where the putty made depressions. The internal piece (B,) is fastened to the piece N, by passing a string through the loop of wire and the piece N, and by tying the string to a stick at E, which is afterwards twisted round. The pieces F and G are fastened in a similar manner by the strings L, L, which form a knot at M. The letters A, A, A, of the figure represent the object from which the mould described is supposed to have been required.

In making moulds of plaster it is often necessary or convenient to form the sharp angles of wax. To do this, the place to be occupied by wax must be first filled with some soft substance, as lard or soap. The portion of the mould above this must then be made of plaster. When this has hardened, it must be removed, trimmed, and a large hole bored through it; the lard which was used to fill the cavity must then be removed, and the piece of plaster replaced. Thus prepared, the melted wax, which should not be hot, must be poured through the hole of the piece just made, and, on cooling, it will form the angle required. If a little rosin is mixed with the wax, the corner will be harder.

Moulds of Isinglass and Glue. — Among the articles for making moulds, isinglass and common glue were mentioned. They can be used as follows: — Dissolve the isinglass or glue in brandy, by a slow fire. The article to be copied must be oiled; then the solution must be poured upon it, and suffered to remain until it is hard. This, though sometimes used, is an inferior mode of copying medals, seals, and coins.

Moulds from tin-foil and tin. — Moulds are made from tin-foil and block-tin, by pressing the material upon the article to be copied. This requires great pressure and must be done with a machine. Silver and bronzed medals, which would be defaced by hot sulphur, are copied in this manner.

MANNER OF SEASONING MOULDS.

After moulds have been well made, the next process is to season them, so that they may not absorb the oil that is put on them to prevent their adhering to the figures which are cast in them. This process is quite simple, and is performed in the following manner: — The plaster mould is allowed to become perfectly dry. Two or three weeks are required for this purpose, unless artificial heat is used. When perfectly dry, the mould is to be well soaked with *boiled linseed oil*, put on very delicately with a brush or sponge. In this state the oil is suffered to dry in the pores of the plaster: when sufficiently dried, another coat must be put on very delicately, and perhaps a third; and when these last coats of oil have become dry, the pores will all be filled, and the mould sufficiently seasoned. Every time the mould is used, it must be lubricated with a mixture of equal parts of oil and tallow.

When the mould must be broken to pieces, as is the case in taking casts of living heads, it need not go through this course of seasoning, but may be prepared in the following manner: — A thick lather, made from common brown soap, must be put on the mould, very faithfully with a brush. This simple process will prevent the mould from absorbing the oil, when an attempt is made to cast. Although this last way is very convenient, and saves much time, (for the mould need not dry before it is thus prepared, and may be used immediately afterwards,) nevertheless, the mould is apt to be soft, and consequently easily broken, and many of its fine parts lost; therefore, except in the case mentioned, or when only two or three casts are required, the process first described had better be employed. Some artists, instead of seasoning their moulds at all, and oiling them each time they are used, prefer to throw into them a thick suds, made from soft soap and hot water; after having turned them round once or twice, they throw out the liquid, and cast in the plaster. This is a very indifferent mode, as the casts are not so clean, and no time or expense is saved by so doing.

METHOD OF CASTING.

Casts from hollow moulds.—When a mould is made and well seasoned, there is nothing easier than to take casts from it. This is done in the following manner:—First, the mould must be gently brushed over with a little of the mixture of oil and tallow, and its different pieces put together and secured in their places by a cord; then, the plaster must be mixed, as described above, care being taken not to have it of too great consistency. All things having been done as described, the liquid plaster must be poured into the mould, which is then turned round several times, till every part of it is lined with plaster. When satisfied of this, the plaster which does not adhere to the sides of the mould must be poured out into the bowl, and be well stirred, to prevent its hardening. After the lapse of a few moments, it is again cast into the mould, and again poured out. This is done several times, until the figure within the mould has attained a sufficient degree of thickness. The plaster which is left after casting the figure, can be put with a spatula around the base of the cast, to make it stronger, and heavier at the bottom. The mould must be left about an hour to stand unmolested; after which time, the string which binds its parts together may be removed, and the mould piece by piece, taken from the figure. The figure thus cast will be hollow, and of course lighter and more convenient to be transported from one place to another, than if solid. The seams must be removed, and the accidental holes filled up in a manner hereafter to be described.

Casts from flat moulds.—Casts are made in flat moulds by merely pouring the liquid plaster upon them, after they have been oiled, and leaving it to harden.

For taking casts from sulphur moulds, a rim of tin, half an inch broad, is necessary. This rim is put around the mould and secured. Oil is then put upon the mould with a brush, and afterwards liquid plaster, likewise with a brush. Using the brush prevents the occurrence of little holes in the cast, which is a great desideratum in medal-casting, as medals cannot be trimmed and repaired so well that the repairs cannot be detected.

MODE OF CASTING IN WAX.

When *wax* is used for casting, care must be taken that it is not too hot. The mould must be oiled, tied together, and warmed, and the warm wax be thrown in and out of it eight or ten times, until the cast is sufficiently strong. When perfectly cold, remove the mould carefully.

MODE OF COLORING CASTS.

The plaster or wax can be colored by any of the common coloring matters, care being taken that no water be put into those which are to unite with the wax, or glue or gummy matter into those which are used for the plaster. Water and wax will not unite together without a third substance; and gum mixed with plaster, greatly retards its setting. Of coloring casts more will be said hereafter.

MANNER OF TAKING MASKS.

It is often a gratification to have the masks of our friends; and as the mode of taking them is very simple, and causes very little inconvenience to the subject, a description of the manner in which they are taken will be briefly given. The individual is made to lie horizontally on his back, with his eyes shut, his hair and eyebrows brushed properly, and well smoothed with pomatum.* A napkin is placed around his head, to prevent the plaster from extending over other parts of the head, and getting into the cavities of the ears. A goose-quill or paper tube is fixed into each nostril by a piece of paper or cotton. Thus made ready, the eyebrows, hair and eyelashes must be gently rubbed over with olive, or with almond oil, which is much pleasanter. The rest of the face need not be oiled, as perspiration will prevent the adhesion of the plaster. The plaster is then put on the face, care being taken not to stop the cavity of the tubes. At first, the face should be but *thinly*, though *entirely* covered with the plaster. When this first coat has become pretty hard, a little more plaster should be laid on, to the thickness of three fourths of an inch. The plaster having become tolerably firm, the quills are to be withdrawn. When hard, the mask can be removed from the face, (the napkin being taken away) by carefully lifting it from the forehead first, and then from the rest of the face. The subject should then wash the plaster from his eyes, before opening them. The plaster would feel more pleasant, and harden quicker, if mixed with warm water. This precaution will take away the shock which is generally experienced, when the plaster is first put on, and which is apt to produce a frown on the expression, which will be unavoidably copied in the cast. The whole process of taking a mask requires only *ten minutes*, and gives, when carefully done, a correct model of the face. This mould from the face can be seasoned with soap, and a cast made in it. To remove the mould, recourse must be had to the mallet and chisel, unless (prior to the plaster being cast into it) it is divided vertically (i. e. from the forehead, between the eyes, and through the nose, mouth and chin,) by a very fine saw. The mould should not be entirely cut through ;

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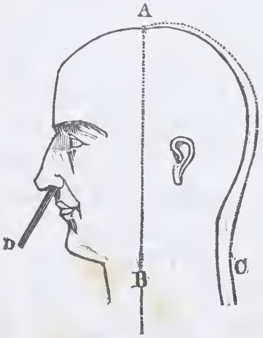
* The best preparation for this purpose, is a mixture of common pomatum and sweet oil. The pomatum is melted and the oil immediately blended with it.

all the outline only should be well sawed, and the remainder broken. The roughness of the fracture will serve as a key to retain the pieces of the mouth in their proper places. A smooth cut with a saw will not allow this.

METHOD OF TAKING CASTS OF WHOLE HEADS.

Moulds of the *whole head* are taken in a similar way. The person must sit upright, his hair must be smoothed down by a brush and pomatum, his ears stuffed with cotton, and a tube put into each nostril, as represented by D, in Fig. IV. A small cord must be placed from B to A, and then over the head to the other side corresponding to B. Another small cord (A, C,) must be placed from the line crossing the vertex, and continued down in a median direction to the nape of the neck. The use of these strings is to cut the plaster just before it is hard, and by this means, facilitate the removal of the plaster shell from the head. Having thus made your subject ready, his head is to be *entirely* covered with the liquid plaster. All the plaster to be used must be put on at one mixing, and when it shall have attained the proper degree of hardness, the strings must be removed in a manner which will divide the whole shell into three pieces; one to contain all of the face, excepting the ears; the other two, to contain each an ear and all of the shell between the line A, C, at the back,

Fig. IV.



and the line A, B, from the top of the head to the point B, indicated in the figure. When the plaster is sufficiently hard to retain its shape, it should be immediately removed from the head.

There is a disadvantage in this manner of procedure which annoys some people very much — viz. the dragging down of the cheeks and angles of the mouth by the weight of the plaster, thereby distorting the features, and destroying the likeness.

The mode which is most in use is that of taking the back part of the head first, and afterwards the front. The manner is as follows: — The head is prepared, and the strings adjusted as above described. The person is then made to lean forward and a napkin is placed around his head, and the plaster laid on. When the plaster has attained a proper degree of hardness, it is divided by the string at the back part of the head.* When this part has become sufficiently hard, the person is made to lay on his ie back (care being taken not to disturb the plaster cast on the back part of his head;) in this situation, plaster is laid on the remaining uncovered part of his head, as was directed for taking a mask. The string passing before the ears must then be removed, and the plaster mould, which is in three pieces, taken from the head.— This manner is likewise objectionable, as the first piece is seldom held so securely that it will not move, and therefore prevents accuracy. Also the hair above the ears is apt to project so as to make the head in that region wider than truth.

The following method of taking casts of heads will prevent the above-mentioned accidents, and, on account of its simplicity, save much trouble. The subject must lie on his back, as if he was to have a mould taken from his face, the back part of his head to be encased in a wooden box.

The annexed figure represents a box prepared for this purpose, and which is so contrived that it will separate into three pieces. The box may at first be made whole, and then divided. In this case an horizontal section, A, B, C, (Fig. V.) must be made with a saw. This will divide it into two parts, the upper of which must be subdivided by a vertical section at D. A, B, represents the lower edge of one of these pieces, and must be behind the ear; D, F, G, the upper edge of the same, and must be before the ear. In other words, the part A, B, D, F, G, and its opposite E, C, H, D, must each include the whole ear of their respective sides and a portion of the head, of the same width, from the neck to the top,

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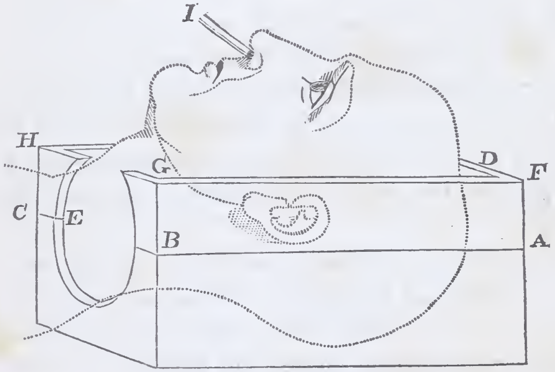
* The proper time of dividing the plaster is when it can be cut easily by the strings, and yet when the cut edges will not adhere together.

Fig. V.



E, represents a circular opening in one end of the box to admit the neck. The head of the person must be prepared with pomatum and oil, and the strings adjusted in the direction of G, F, D, H, and B, A, C, so as to divide the mould into four pieces with the aid of another string, which shall correspond to the vertical section of the box at D, and which must be kept in place by them. The tubes I, having been placed in the nostrils, the head is properly prepared for the application of the plaster. This is done as follows: the box is first filled with liquid plaster, and then the face is carefully covered. To cut this mould into pieces, we have only to withdraw the strings, over the edge G, F, D, H, and through the slits at B, A, C, and D. After this division the plaster will soon be sufficiently hard to be removed, which can easily be done.

To get a model of the head from this cast, it first must be prepared with soap, as previously directed, and its parts put together so as to form a mould: into this mould the plaster must be cast, until the model within has attained a great thickness; after which, the shell must be removed with a mallet and chisel. In using the chisel, great care must be taken not to destroy the ears of the cast. When the cast is made, it can be put upon a pedestal, the eyes opened and trimmed.

TRIMMING AND REPAIRING CASTS.

It often becomes necessary to fill up accidental depressions in casts. To do this, the surface of the depression is first made rough by any pointed instrument: it is then moistened with water, and plaster is put into it and smoothed over with a knife. If the cast has just been made, and has not become dry, a little of its substance can be scraped off and used for the filling of such defects.

Casts are mended by making the edges to be joined together, rough and moist, and by putting a little newly mixed plaster between them, as a cement. The pieces having been pressed together, the superabundant plaster will be forced out, and can be removed by the knife. When figures are cast in parts, the different pieces are united in the same manner. A very strong cement for repairing alabaster and marble busts, precious stones, and other mineral and hard substances, is made in the following manner, and used as plaster: — Take of glue or gum size, and finely ground plaster, and, for giving color, a little of the powdered substance of the article to be mended, as much as will make a paste of the consistency of cream. One or two days are required for the cement to become hard.

The broken parts of seasoned moulds can be cemented together by a composition of 2 parts of bees-wax and 1 of rosin. This composition must be melted and applied to their broken surfaces; after which they must be heated until the wax is fluid, when they can be pressed together, and the superfluous cement removed with a knife.

After casts have been made, the seams caused by the mould are removed by the knife. They are then put away until they become dry, after which they are smoothed by very fine sandpaper or dogfish-skin, and polished by a Dutch rush. The rush is moistened in water and is capable of giving them an exquisite smoothness.

MODE OF POLISHING, BRONZING, AND PAINTING CASTS.

The following is the method adopted by artists to give their casts a polish which resembles marble. They are first made smooth, and brushed over with a mixture of soap and white wax. A quarter of an ounce of white soap is dissolved in half a pint of warm water, with which an equal quantity of white wax is afterwards incorporated. The casts may be dipped into this solution, or washed with it plentifully. After drying an hour, they are polished by being rubbed with soft linen or flannel. A polish produced in this manner rivals the finest work executed in marble. Other methods are adopted to produce this resemblance to marble, but as the one described is the best, the others will not be mentioned.

If casts are to be exposed to the inclemencies of the weather, they can be made more durable by filling their pores with boiled linseed oil, with which wax or resin has been blended. After this preparation, they can be painted with white-lead or varnished.

There are many modes of bronzing laid down in books, but the following is the most preferred, on account of its simplicity, and the readiness with which all the articles can be procured. The casts must be first trimmed and made smooth. The next step is to cover them well with a size, made of glue, colored with lampblack. When this size has been permitted to dry, the cast will appear black and without polish, and is ready for a coat of paint, made of varnish* and coloring materials. Perhaps the best color † is made by a mixture of *chrome green* and *lamp-black* well blended together. This must be put on with a brush, and when dry, a little Dutch metal, or, as it is known here, *copper bronze*, must be mixed with a little of the paint or varnish, and rubbed on the most prominent parts of the cast. A coat of copal varnish may be put over all, after the casts are dry. When done well, the plaster figures will resemble those cast in bronze. The cheapest and most satisfactory way, however, is to get articles bronzed by those who are well practised in the art, and to whose profession it immediately belongs, viz. the painters and plaster-casters.

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* This varnish is made by melting rosin in a cup, and adding to it a sufficient quantity of oil of turpentine to give it the consistency of oil paint.

† A very handsome green is produced by the mixture of chrome yellow and Prussian blue.

Next to bronzing, the best way to prepare casts is to paint them with dead white paint, i. e. white-lead mixed with other materials in such a manner as to dry without a gloss. Casts painted in this manner soon attain the complexion of human flesh.

Having completed, in a hasty and concise manner, an account of the method by which the whole trade of casting is performed, it is hoped that some advantages may be taken of it by many of the sciences, and especially by that which treats more particularly of man. Much interest is now taken in the fascinating study of Phrenology; and as this science depends upon proofs which must be brought immediately to the sight and touch, it is likewise to be hoped that the few rules which have been here given, and the simplicity of the processes described, will induce all connected with this study to secure for inquirers all cases remarkable for a deficiency or overshare of any faculty.

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